a simple combustion of ammonia out of the body, as well as in the body, nitric acid was produced. From other experiments it appears that urea, also, by oxidation, whether in the body or out of the body, gives rise to nitric acid.

Having found that nitric acid was produced more readily and frequently than had been supposed to be the case, the author was led to try whether combustions in the atmosphere without ammonia could not give nitric acid. The presence of this acid was, in consequence, detected in the products of the combustion of alcohol, of coal, of a wax candle, and of hydrogen.

As this led to the supposition that nitric acid might exist in rain-water at all times, experiments were made on the rain-water collected on wet days in London, and the presence of nitric acid was discovered by the starch and also by the indigo test.

The conclusions the author comes to from his experiments are:—

1. That the action of oxygen takes place in the body, not only on hydrogen, carbon, sulphur and phosphorus, but also on nitrogen.

2. That in all cases of combustion, out of the body and in the body, if ammonia be present, it will be converted partly into nitric acid.

3. That the nitrogen of the air is not indifferent in ordinary cases of combustion, but that it gives rise to minute quantities of nitric acid.

He further remarks, that the production of nitric acid from ammonia in the body adds another to thè many instances of the action of oxygen in man; and that the detection of nitric acid in the urine may lead to the conclusion, that the blood is being freed from ammonia, or from substances closely related to it, as urea, or possibly caffein and other alkaloids.

2. "Description of a Muscle of the striped variety, situated at the posterior part of the choroid coat of the Eye in Mammals, with an explanation of its mode of action in adapting the Eye to distinct vision at different distances." By George Rainey, Esq., M.R.C.S. Communicated by Joseph H. Green, Esq., F.R.S. Received December 24, 1850.

Respecting this muscle, the author observes that it occupies about the posterior two-thirds of the choroid coat, its fibres lying in different planes, the most superficial being immediately beneath the membrana pigmenti, the deepest extending almost as far as the vasa vorticosa; that these fibres pass in different directions, some going from before to behind, and others intersecting these at various angles: altogether they receive the pigment membrane, the retina and the vitreous humour as into a cup.

From the connection of these fibres with the choroid coat, the author calls them the choroid muscle. He has not been able to trace them nearer to the ciliary ligament than about two-thirds of the distance from the centre of the choroid to the border of the cornea, in which situation the fasciculi become broken up, and gradually degenerate into filamentous tissue. No striped fibres can be detected in the so-called ciliary muscle or ligament. These the author

considers to be merely for the purpose of connecting the sclerotic and choroid anteriorly, as these tunics are also connected by cellular tissue posteriorly, but very loosely in their middle.

The author next describes the manner in which these fibres may be most easily displayed, and, as the sheep's eye answers best for this purpose, his description is given in reference to it. The posterior two-thirds of the eye of the sheep being turned inside out, and all the retina washed away, a very thin portion of the tapetum is raised and floated upon a glass slide, and a thin glass cover is then placed upon it, without making the least pressure, which would, by crushing the very soft primary fasciculi, render the transverse striæ irregular and confused. If in this state it be examined by the microscope, the muscular fibres, in consequence of their transparency, and being covered by the membrana pigmenti, and some of the iridescent fibres of the tapetum, will be very indistinct and scarcely distinguishable; but if a small portion of acetic acid, or some aqueous solution of chlorine, be brought in contact with it, the membrana pigmenti, and especially the iridescent fibres, will instantly shrink, and, becoming transparent, disappear, and the fasciculi of the choroid muscle will come into view. Should the acetic acid have been too strong, the transverse marking will be very faint and scarcely discernible; but if the acid be washed away with water, or, what is better, a weak solution of any saline substance, such as chloride of potassium or sodium, iodide of potassium, &c., the transverse marking will become very distinct; should the solution be strong, the colour of the iridescent fibres will be reproduced. In the eye of those animals whose tapetum is scaly, as in the Cat, or where the whole of the choroid is lined by black pigment, as in the human subject, the acetic acid is of no use, and the muscle is displayed with much greater difficulty; the author, however, states that he has succeeded in displaying this muscle in the choroid of the Horse, the Cat, and in that of the human eye*.

The author next considers the action of the choroid muscle. This, from the manner in which the muscle embraces the vitreous humour, is, in his opinion, to compress this humour and carry the lens forwards. But this, he observes, considering how the capsule of the lens and the ciliary processes fill up the posterior chamber of the aqueous humour, cannot be effected without displacing some of the fluid in that chamber; and he concludes that the aqueous humour in the posterior chamber being pressed by the capsule of the lens (forced forwards by the action of the choroid muscle) against the ciliary processes, forces the blood out of their vessels into the choroid veins, and thus enlarges this chamber at its circumference, whilst it diminishes it from behind forwards, or, in other words, moves the lens forwards. The author then observes, that, as the effect of the action of the choroid muscle is to separate the choroid coat from the sclerotic, all pressure is taken off the choroid veins at the time it is made upon the ciliary processes, and therefore that

* The author has found, since the paper was read, that a solution of citric acid, one drachm of acid to the ounce of water, is the best substance for rendering the iridescent fibre transparent.

every facility possible is afforded for the emptying of the vessels of these processes. He hence infers that the office of these processes is to allow of the displacement of fluid when the lens is carried forwards; and when the choroid muscle ceases to act, by the re-distension of their capillaries, to carry the lens back into its place. The author then enters into a mathematical examination of the data furnished by these facts, to show how exactly they fulfill the conditions necessary for adapting the eye, viewed as an optical instrument, to distinct vision at different distances. The author considers that there is no analogy either in structure or function between those fibres in mammals occupying a situation similar to that occupied by a true muscle in Birds (the ciliary muscle), but that the true analogue of the ciliary muscle in birds is the choroid muscle in mammals, the chief difference between them being in situation. In the Pigeon, he finds that the ciliary muscle is inserted into the choroid coat, along which it can be traced as far back as about $\frac{1}{8}$th of an inch behind the iris, so that its action would be to draw the choroid tense upon the vitreous humour, and thus to compress it similarly to the choroid muscle in the mammal. Besides, in the Bird he finds no muscular fibres at the posterior part of the choroid. The ciliary muscle is more distinct, and appears to be stronger than the choroid, but this the author attributes to the fibres of the one being much more collected, and therefore limited to a much smaller space than those of the other.

February 6, 1851.

GEORGE RENNIE, Esq., V.P., in the Chair.

A paper was read, entitled "On the Supply of Water from the Chalk Stratum in the neighbourhood of London." By John Dickinson, Esq., F.R.S. Received January 6, 1851.

The object of this paper is to explain and illustrate the supply of subterranean water which is always found at certain depths in the chalk strata; the circumstances that influence its natural outflow by springs and rivers; the practicability of draining off that water by an artificial mode of exhaustion; and the changes that would be produced by carrying such an operation into effect on a large scale.

It is stated, that numerous perennial streams issue from the elevated ridges of the chalk strata, those in Kent and Surrey flowing from south to north, and those in Buckinghamshire, Herts and Essex, flowing from north to south; and that in each case the dip of the strata corresponds with the fall of the country and the direction of the streams. These rivers are considered to be the natural outflow of the rain-water imbibed by the chalk, the accumulation of which, as explained by Dr. Buckland, is in a subterranean reservoir; and according to the periodical filling and exhaustion of this, the springs and streams alternately decrease and are augmented. The circumstances regulating this change, which have been observed and